

## PATENT ABSTRACTS OF JAPAN

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## (54) PACKAGING STRETCHED FILM

## (57)Abstract:

PROBLEM TO BE SOLVED: To provide a packaging stretched film having satisfactory transparency, excellent flexibility, deformation restorableness, cuttability, heat resistance and the like.

SOLUTION: This stretched film comprising at least three layers comprises both outer surface layers constituted by ethylene polymer (A), and at least one of intermediate layers constituted by 60 to 95 wt.% of resin mixture (B) containing 20 to 80 wt.% of amorphous propylene polymer (b1) and 80 to 20 wt.% of crystalline propylene polymer (b2) and resin composition (D) containing 40 to 5 wt.% of petroleum resin or its hydrogen additive (C).

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CLAIMS

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[Claim(s)]

[Claim 1] Are the film which consists of at least three layers, and both external layers consist of ethylene system polymers A. at least one layer of an interlayer -- the amorphous polyolefine b1 -- the resin mixture B60-95 % of the weight which comes to contain 20 - 80 % of the weight, and crystalline propylene system polymer b280-20 % of the weight -- and The stretch film for a package characterized by consisting of resin constituents D containing petroleum resin or 40 - 5 % of the weight of its hydrogenation object C.

[Claim 2] the ethylene system polymer A -- low density polyethylene and a line -- the stretch film for a package according to claim 1 which are at least one sort of ethylene system polymers chosen from low density polyethylene, super-low density polyethylene, an ethylene-vinylacetate copolymer, an ethylene-ethyl-acrylate copolymer, and an ethylene-methacrylic ester copolymer.

[Claim 3] The stretch film for a package according to claim 2 whose ethylene system polymer A is an ethylene-vinylacetate copolymer.

[Claim 4] The stretch film for a package according to claim 1 whose content of the repeat unit guided from the repeat unit and/or butene-1 to which the amorphous polyolefine b1 is guided from a propylene is 50% of the weight or more of amorphous polyolefine.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the stretch film for a package which consists of at least three layers. Furthermore, it is related with the stretch film for a package which has transparency, flexibility, deformation recoverability, cut nature, thermal resistance, etc. in detail as an elasticity film which may be equal to an elasticity vinyl chloride film or the Vinyon film.

[0002]

[Description of the Prior Art] Many elasticity vinyl chloride films which contain a plasticizer as an elasticity film in recent years have been used. However, soft polyvinylchloride resin is in the condition of having held the problem of a plasticizer, the toxicity by the bleed out of a monomer, or transition and the acid rain problem by generating of the hydrogen chloride at the time of incineration, and the social effect of dioxin generating.

[0003] On the other hand, as an elasticity film similar to the above-mentioned elasticity vinyl chloride film, there are some which consist of a polymer which makes a subject ethylene, such as an ethylene-vinylacetate copolymer, low density polyethylene, and an ionomer. However, the elasticity film which consists of a polymer which makes these ethylene a subject is inferior to thermal resistance or nerve, when inferior to an elasticity vinyl chloride film in respect of transparency, Hayes, a gross, etc.

[0004] For this reason, for example, the film which carries out the laminating of the ethylene system resin to the layer which consists of mixture of crystalline olefin system resin and an olefin system elastomer is proposed by JP,5-147174,A. Moreover, the film which carries out the laminating of the ethylene system resin to the layer which becomes JP,6-927,A from the resin constituent containing amorphous polyolefine and crystalline polypropylene is proposed. However, although deformation recoverability is excellent, since these films had the too strong repulsive force of a film, when they packed the plastic tray containing food with an automatic packer, the film broke with repulsive force at the time of a film cut, and they had the problem which a packaging machine stops and to say.

[0005]

[Problem(s) to be Solved by the Invention] The purpose of this invention has good transparency and it is to offer the stretch film for a package which is excellent in flexibility, deformation recoverability, cut nature, thermal resistance, etc.

[0006]

[Means for Solving the Problem] this invention persons completed a header and this invention for the film of at least 3 lamination which both external layers consist of ethylene system polymers, and consists of resin constituents with which at least one layer of an interlayer comes to contain amorphous polyolefine, a crystalline propylene system polymer and petroleum resin, or its hydrogenation object by the predetermined ratio attaining the above-mentioned purpose, as a result of repeating research wholeheartedly for the above-mentioned purpose.

[0007] Namely, this invention is a film which consists of at least three layers. both external layers consist of ethylene system polymers A -- having -- at least one layer of an interlayer -- the amorphous polyolefine b1 -- the resin mixture B60-95 % of the weight which comes to



weight %. As amorphous polyolefine, commercial UBETAC UT2385 and UT2780 by Ube Rexene etc. can be used, for example.

[0017] The crystalline propylene system polymer b2 used by this invention may say isotactic polypropylene, and a propylene homopolymer is sufficient as it, and they may be a random copolymer with the alpha olefin of the propylene and ethylene whose content of a propylene unit is more than 70 mol %, or carbon numbers 4-10, block copolymers, or such mixture.

[0018] A blend system block copolymer can be manufactured a Ziegler-Natta catalyst by the bottom of existence of the well-known catalyst for olefin polymerization by the slurry polymerization method, the solution polymerization method, the  $\pi$ -like polymerization method, and the vapor-phase-polymerization method, using a well-known polymerization method.

[0019] The crystalline propylene system polymer b2 of this invention can change the fluidity which is the approach that it is well-known under existence of organic peroxide and un-existing, for example, is represented with a melt flow rate.

[0020] The petroleum resin used by this invention or its hydrogenation object C is thermoplastics which carried out the polymerization of the decomposition oil fraction generated by the pyrolysis of petroleum, and was solidified, and the aliphatic series system which used C5 fraction as the raw material, the aromatic series system which used C9 fraction as the raw material and both copolymerization system, a dicyclopentadiene system, and the hydrogenation system that hydrogenated these further are mentioned. Specifically, commercial items, such as high RETTSU by Mitsui Petrochemical Industries, Ltd., PETOROJIN, and AI Cong made from Arakawa Chemical industry, can be used.

[0021] In these petroleum resin or its hydrogenation object, a hydrogenation system is excellent in a color tone and a stinking thing point.

[0022] Especially the preparation approach of the above-mentioned resin constituent D used by this invention is not restricted, and heating melting kneading can be carried out using kneading machines, such as a well-known approach, for example, a kneader, a Banbury mixer, and a roll, one shaft, or a twin screw extruder, and it can be performed. Moreover, the dryblend of the various resin pellets may be carried out.

[0023] Moreover, it is possible to include various additives, a filler, for example, an antioxidant, an antifogger, an antistatic agent, a nucleating additive, a flame retarder, etc. in the above-mentioned resin constituent D used by this invention if needed. Furthermore, other resin can also be blended and used again in the range which does not become the hindrance of this invention. For example, recycle resin can be blended.

[0024] The resin mixture B used by this invention contains 20 - 80 % of the weight of amorphous polyolefines, and 80 - 20 % of the weight of crystalline propylene system polymers. Since the thermal resistance of a film falls when the flexibility of a film falls at less than 20 % of the weight and the rate of amorphous polyolefine, on the other hand, exceeds 80 % of the weight, it is not desirable. The resin mixture B which contains 30 - 70 % of the weight of amorphous polyolefines and 70 - 30 % of the weight of crystalline propylene system polymers especially is desirable from a viewpoint of balance with flexibility and thermal resistance.

[0025] Moreover, the resin constituent D used by this invention contains said resin mixture B60-95 % of the weight and petroleum resin, or 40 - 5 % of the weight of its tank additive C. Since the impact strength of a film falls when the cut nature of a film falls at less than 5 % of the weight and the rate of petroleum resin or its hydrogenation object, on the other hand, exceeds 40 % of the weight, it is not desirable. The resin constituent D which contains said resin mixture B70-90 % of the weight and petroleum resin, or 30 - 10 % of the weight of its tank additive C especially is desirable from a viewpoint of balance with cut nature and impact strength.

[0026] In order that the stretch film for a package of this invention may carry out laminating insertion of the recycle resin layer and may give the middle class, other thermoplastics layers, for example, gas barrier, it may carry out laminating insertion of polyamide resin, an ethylene-vinylalcohol copolymer, the polyester resin, etc. Furthermore, in order to raise the bond strength between layers, laminating insertion of adhesives or the adhesive resin layer may be carried out.

[0027] Especially the thickness of each class which constitutes the stretch film for a package of this invention is not limited, and can be chosen as arbitration. Usually, each class is formed in

the range of about 2–100 micrometers. Moreover, the thickness ratio of both the external layers to the film total thickness is not limited especially, either, and can be chosen as arbitration. Usually, both external layer thickness is constituted so that it may become 20 – 90% of the whole stretch film thickness for a package.

[0028] Especially the process of the stretch film for a package of this invention is not limited, and a well-known approach, for example, the co-extrusion laminated layers method by the tubular film process or the cast method, an extrusion lamination process, a sand lamination process, a dry lamination process, etc. can be used for it.

[0029] It is desirable to extend after film production to the stretch film for a package of this invention, at at least 1 shaft orientations, when shrinkage characteristics are required. Extension is possible also with one shaft or two shafts. When it is uniaxial stretching, the roll extending method usually used is desirable. Moreover, in the case of biaxial stretching, after extending for example, on one shaft, the serial extension method which performs biaxial stretching may be used, and it is possible also by the approach of carrying out coincidence biaxial stretching like tubular extension.

[0030]

[Effect of the Invention] As explained in full detail above, according to this invention, transparency is good and the stretch film for a package excellent in flexibility, deformation recoverability, cut nature, and thermal resistance can be applied. Moreover, the stretch film for a package of this invention is an elasticity film, and can be applied to various applications instead of the elasticity vinyl chloride film which poses a social problem by environmental pollution.

[0031]

[Example] Next, although an example is given and this invention is explained in more detail, this invention is not limited to these examples.

[0032] The measuring method of the physical-properties value in the following examples and examples of a comparison is explained first.

(1) It measured by the  $^{13}\text{C}$ -NMR method by the approach indicated by 615–616 pages of the content giant-molecule analysis handbook (1995, Kinokuniya issue) of an ethylene unit.

(2) It measured by the  $^{13}\text{C}$ -NMR method by the approach indicated by 615-619 pages of the content giant-molecule analysis handbook (1995, Kinokuniya issue) of a propylene unit and a butene-1 unit.

(3) Melt flow rate (MFR)

JIS According to K7210, the ethylene system polymer followed the conditions 4 of Table 1, and it measured by a crystalline propylene system polymer following the conditions 14 of Table 1.

(4) Content JIS of a vinyl acetate unit It measured according to K6730.

(5) Rigidity (1%SM)

The film test piece of the shape of a 120mmx20mm strip of paper which made straight side the direction of taking over (MD) and the direction of taking over, and perpendicular direction (TD) of a film was pulled by part for 60mm and speed-of-testing [ of 5mm ]/between grips, and the stress when being extended 1% was measured.

[0033] (6) Transparency (Haves)

ASTM It measured according to D1003.

[0034] (7) The break lump after a film cut when packing the tray made from styrene foam using the pressure-from-below type tray automatic packer ( AWby TERAOKA elaborate company 2600 AT-III.PE) of cut nature marketing was judged as follows.

O : there is no break lump of a film and it is very good.

**\*\*:** It is good although a break lump of a film is seen a little.

x: A break lump of a film is seen.

(8) The tray made from styrene foam was packed using the pressure-from-below type tray automatic packer (AWby TERAOKA elaborate company 2600 AT-III.PE) of surface result marketing, and Siwa of the film on the top face of a tray, deformation of a tray, etc. were judged as follows.

O : there are not Siwa, tray deformation, etc. and it is very good.

**\*\*:** It is good although Siwa and tray deformation are seen a little.

x: Siwa and tray deformation are seen.

(9) After having fixed the circular sample film 1 with a deformation recoverability diameter of 44.45mm to the film fixture 2, stuffing into the core of a film the pin 3 which carried out the semi-sphere configuration whose tip is the radius of 6.35mm to the predetermined depth 5 the rate for 100mm/using the load cell 4 and pulling up at this rate immediately, it measured whether incrustation would disappear completely within 30 seconds. Incrustation considered the maximum pushing depth 5 which disappears completely as whenever [ deformation recovery ]. Drawing 1 is the top view of the equipment which measures whenever [ deformation recovery ].

(10) One film was contacted to the hot platen for heat seals of the hand type tray packaging machine ( poly wrapper made from ARC) of heat-resistant marketing for 2 seconds, the highest hot-platen temperature which a hole does not open to a film was measured, and it considered as heat-resistant temperature.

[0035] Example 1 [preparation of an external layer resin constituent]

As a resin constituent which constitutes an external layer, 98 % of the weight (the content of Eve Tait H2081 by Sumitomo Chemical Co., Ltd., 10 MFR(190 degrees C) =2g /, and minutes, and a vinyl acetate unit = 15.8 % of the weight) of ethylene-vinylacetate copolymers and the resin constituent which carried out melting kneading and prepared 2 % of the weight (Marubishi Yuka Kogyo STO- 405) of antifoggers with the Banbury mixer were used.

[0036] [Preparation of an interlayer resin constituent] In the resin constituent which constitutes an interlayer As a crystalline propylene system polymer, it is a propylene-ethylene random copolymer (no BUREN WF 732-1 by Sumitomo Chemical Co., Ltd., and ten MFR(230 degrees C) =5.5g /, and parts). 3-% of the weight 50 % of the weight, The content of content =97% of the weight of a propylene unit, and an ethylene unit = as amorphous polyolefine -- a propylene-butene-1 copolymer (UBETAC UT 2780 by Ube Rexene --) The content of a propylene unit = 65 % of the weight, The content of a butene-1 unit = the resin constituent which carried out melting kneading and prepared 80 % of the weight of resin mixture and 20 % of the weight (Al Cong P125 made from Arakawa Chemical industry) of petroleum resin which carried out melting kneading of the 50 % of the weight with the Banbury mixer 35% of the weight with the 1 shaft extruder was used.

[0037] [Manufacture of a film] In an external layer, it has the obtained ethylene-vinylacetate copolymer constituent, and has the resin constituent of amorphous polyolefine, a crystalline propylene system polymer, and petroleum resin in an interlayer, and the percentage of an external layer / interlayer / external layer fabricated the two-sort three-layer laminated film which is the thickness of 13 micrometers which is 38/24/38 by the blow up ratio 4.5 with the working temperature of 190 degrees C using the Placo three-layer tubular blown film processing machine. The evaluation result of the obtained film is shown in Table 1.

[0038] The laminated film was fabricated like the example 1 except using the 100 % of the weight of the same crystalline propylene system polymers as what was used for example of comparison 1 interlayer in the example 1. The evaluation result of the obtained film is shown in Table 1.

[0039] The laminated film was fabricated like the example 1 except using 100 % of the weight of resin mixture containing the 50 % of the weight of the same amorphous polyolefines as what was used in 50 same % of the weight of crystalline propylene system polymers and the same example 1 as what was used for example of comparison 2 interlayer in the example 1. The evaluation result of the obtained film is shown in Table 1.

[0040]

[Table 1]

			実施例 1	比較例 1	比較例 2
フイルム構成	外面層	EVA	98%	98%	98%
		STO-405	2%	2%	2%
	中間層	APO/(APO+PP)×100	50%	0%	50%
		PP/(APO+PP)×100	50%	100%	50%
		(APO+PP)/中間層組成物×100	80%	100%	100%
		P125/中間層組成物×100	20%	0%	0%
	層構成比 (外面層／中間層／外面層)		38／24／38	38／24／38	38／24／38
	フィルム厚み (μm)		13	13	13
物性	1%SM(kg/cm <sup>2</sup> ) MD/TD		520/540	2400/2500	500/520
	ヘイズ (%)		1.3	1.8	1.4
	カット性		○	△	×
	表面仕上がり		○	×	△
	変形回復性 (mm)		14	7	11
	耐熱性 (℃)		113	120	115

front Naka and EVA:ethylene-vinylacetate copolymer PP : crystalline propylene system polymer  
APO:amorphous polyolefine STO-405: -- antifogger (Marubishi Yuka Kogyo STO- 405)  
P125: Petroleum resin (Al Cong P125 made from Arakawa Chemical industry)

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the stretch film for a package which consists of at least three layers. Furthermore, it is related with the stretch film for a package which has transparency, flexibility, deformation recoverability, cut nature, thermal resistance, etc. in detail as an elasticity film which may be equal to an elasticity vinyl chloride film or the Vinyon film.

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PRIOR ART

[Description of the Prior Art] Many elasticity vinyl chloride films which contain a plasticizer as an elasticity film in recent years have been used. However, soft polyvinylchloride resin is in the condition of having held the problem of a plasticizer, the toxicity by the bleed out of a monomer, or transition and the acid rain problem by generating of the hydrogen chloride at the time of incineration, and the social effect of dioxin generating.

[0003] On the other hand, as an elasticity film similar to the above-mentioned elasticity vinyl chloride film, there are some which consist of a polymer which makes a subject ethylene, such as an ethylene-vinylacetate copolymer, low density polyethylene, and an ionomer. However, the elasticity film which consists of a polymer which makes these ethylene a subject is inferior to thermal resistance or nerve, when inferior to an elasticity vinyl chloride film in respect of transparency, Hayes, a gross, etc.

[0004] For this reason, for example, the film which carries out the laminating of the ethylene system resin to the layer which consists of mixture of crystalline olefin system resin and an olefin system elastomer is proposed by JP,5-147174,A. Moreover, the film which carries out the laminating of the ethylene system resin to the layer which becomes JP,6-927,A from the resin constituent containing amorphous polyolefine and crystalline polypropylene is proposed. However, although deformation recoverability is excellent, since these films had the too strong repulsive force of a film, when they packed the plastic tray containing food with an automatic packer, the film broke with repulsive force at the time of a film cut, and they had the problem which a packaging machine stops and to say.

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EFFECT OF THE INVENTION

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[Effect of the Invention] As explained in full detail above, according to this invention, transparency is good and the stretch film for a package excellent in flexibility, deformation recoverability, cut nature, and thermal resistance can be applied. Moreover, the stretch film for a package of this invention is an elasticity film, and can be applied to various applications instead of the elasticity vinyl chloride film which poses a social problem by environmental pollution.  
[0031]

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] The purpose of this invention has good transparency and it is to offer the stretch film for a package which is excellent in flexibility, deformation recoverability, cut nature, thermal resistance, etc.

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MEANS

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[Means for Solving the Problem] this invention persons completed a header and this invention for the film of at least 3 lamination which both external layers consist of ethylene system polymers, and consists of resin constituents with which at least one layer of an interlayer comes to contain amorphous polyolefine, a crystalline propylene system polymer and petroleum resin, or its hydrogenation object by the predetermined ratio attaining the above-mentioned purpose, as a result of repeating research wholeheartedly for the above-mentioned purpose.

[0007] Dimethylsilyl (fluorenyl) (2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (3-methyl-2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (3, 5-dimethyl-2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (3-tert-butyl-2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (3-tert-butyl-5-methyl-2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (3, 5-G tert-butyl-2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (5-methyl-3-phenyl-2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (3-tert-butyl-5-methyl-2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (5-methyl-3-trimethylsilyl-2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (3-tert-butyl-5-methoxy-2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (3-tert-butyl-5-chloro-2-phenoxy) titanium dichloride, Dimethylsilyl (fluorenyl) (3, 5-Gia Mill-2-phenoxy) titanium dichloride, Dimethylsilyl (tetramethylcyclopentadienyl) (1-naphthoxy-2-IRU) titanium dichloride etc., The (cyclopentadienyl) of these compounds (Dimethylcyclopentadienyl), (Trimethylcyclopentadienyl), (ethylcyclopentadienyl), (n-propylcyclopentadienyl) and (isopropyl cyclopentadienyl), i.e., this invention Are the film which consists of at least three layers, and both external layers consist of ethylene system polymers A. at least one layer of an interlayer -- the amorphous polyolefine b1 -- the resin mixture B60-95 % of the weight which comes to contain 20 - 80 % of the weight, and crystalline propylene system polymer b280-20 % of the weight -- and It is the stretch film for a package characterized by consisting of resin constituents D containing petroleum resin or 40 - 5 % of the weight of its hydrogenation object C. Hereafter, this invention is explained to a detail.

[0008]

[Embodiment of the Invention] This invention is a stretch film for a package which consists of at least three layers of both external layers and the middle class. Both the external layers concerning this invention consist of ethylene system polymers. the ethylene system polymer used by this invention -- low density polyethylene and a line -- with the copolymer which uses low density polyethylene, super-low density polyethylene, medium density polyethylene, high density polyethylene, and ethylene as a principal component, i.e., ethylene The alpha olefin of the carbon numbers 3-10, such as a propylene, butene-1, a pentene -1, a hexene -1, a heptene -1, and octene -1; Vinyl acetate, Vinyl ester, such as propionic-acid vinyl; A methyl acrylate, an ethyl acrylate, One sort chosen from unsaturated compounds like unsaturated-carboxylic-acid ester [, such as a methyl methacrylate and ethyl methacrylate, ]; and its ionomer, conjugated diene, or nonconjugated diene or two sorts or more of a copolymer or plural copolymers with a comonomer are said. Moreover, mixed use of two or more sorts of polymers or copolymers may be carried out.

[0009] the inside of these ethylene system polymers -- low density polyethylene and a line -- at least one sort of ethylene system polymers chosen from low density polyethylene, super-low



Arakawa Chemical industry, can be used.

[0021] In these petroleum resin or its hydrogenation object, a hydrogenation system is excellent in a color tone and a stinking thing point.

[0022] Especially the preparation approach of the above-mentioned resin constituent D used by this invention is not restricted, and heating melting kneading can be carried out using kneading machines, such as a well-known approach, for example, a kneader, a Banbury mixer, and a roll, one shaft, or a twin screw extruder, and it can be performed. Moreover, the dryblend of the various resin pellets may be carried out.

[0023] Moreover, it is possible to include various additives, a filler, for example, an antioxidant, an antifogger, an antistatic agent, a nucleating additive, a flame retarder, etc. in the above-mentioned resin constituent D used by this invention if needed. Furthermore, other resin can also be blended and used again in the range which does not become the hindrance of this invention. For example, recycle resin can be blended.

[0024] The resin mixture B used by this invention contains 20 - 80 % of the weight of amorphous polyolefines, and 80 - 20 % of the weight of crystalline propylene system polymers. Since the thermal resistance of a film falls when the flexibility of a film falls at less than 20 % of the weight and the rate of amorphous polyolefine, on the other hand, exceeds 80 % of the weight, it is not desirable. The resin mixture B which contains 30 - 70 % of the weight of amorphous polyolefines and 70 - 30 % of the weight of crystalline propylene system polymers especially is desirable from a viewpoint of balance with flexibility and thermal resistance.

[0025] Moreover, the resin constituent D used by this invention contains said resin mixture B60-95 % of the weight and petroleum resin, or 40 - 5 % of the weight of its tank additive C. Since the impact strength of a film falls when the cut nature of a film falls at less than 5 % of the weight and the rate of petroleum resin or its hydrogenation object, on the other hand, exceeds 40 % of the weight, it is not desirable. The resin constituent D which contains said resin mixture B70-90 % of the weight and petroleum resin, or 30 - 10 % of the weight of its tank additive C especially is desirable from a viewpoint of balance with cut nature and impact strength.

[0026] In order that the stretch film for a package of this invention may carry out laminating insertion of the recycle resin layer and may give the middle class, other thermoplastics layers, for example, gas barrier, it may carry out laminating insertion of polyamide resin, an ethylene-vinylalcohol copolymer, the polyester resin, etc. Furthermore, in order to raise the bond strength between layers, laminating insertion of adhesives or the adhesive resin layer may be carried out.

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EXAMPLE

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[0032] The measuring method of the physical-properties value in the following examples and examples of a comparison is explained first.

(1) It measured by the <sup>13</sup>C-NMR method by the approach indicated by 615-616 pages of the content giant-molecule analysis handbook (1995, Kinokuniya issue) of an ethylene unit.

(2) It measured by the <sup>13</sup>C-NMR method by the approach indicated by 615-619 pages of the content giant-molecule analysis handbook (1995, Kinokuniya issue) of a propylene unit and a butene-1 unit.

(3) Melt flow rate (MFR)

JIS According to K7210, the ethylene system polymer followed the conditions 4 of Table 1, and it measured by a crystalline propylene system polymer following the conditions 14 of Table 1.

(4) Content JIS of a vinyl acetate unit It measured according to K6730.

(5) Rigidity (1%SM)

The film test piece of the shape of a 120mmx20mm strip of paper which made straight side the direction of taking over (MD) and the direction of taking over, and perpendicular direction (TD) of a film was pulled by part for 60mm and speed-of-testing [ of 5mm ]/between grips, and the stress when being extended 1% was measured.

[0033] (6) Transparency (Hayes)

ASTM It measured according to D1003.

[0034] (7) The break lump after a film cut when packing the tray made from styrene foam using the pressure-from-below type tray automatic packer ( AWby TERAOKA elaborate company 2600 AT-III.PE) of cut nature marketing was judged as follows.

O : there is no break lump of a film and it is very good.

\*\*: It is good although a break lump of a film is seen a little.

x: A break lump of a film is seen.

(8) The tray made from styrene foam was packed using the pressure-from-below type tray automatic packer ( AWby TERAOKA elaborate company 2600 AT-III.PE) of surface result marketing, and Siwa of the film on the top face of a tray, deformation of a tray, etc. were judged as follows.

O : there are not Siwa, tray deformation, etc. and it is very good.

\*\*: It is good although Siwa and tray deformation are seen a little.

x: Siwa and tray deformation are seen.

(9) After having fixed the circular sample film 1 with a deformation recoverability diameter of 44.45mm to the film fixture 2, stuffing into the core of a film the pin 3 which carried out the semi-sphere configuration whose tip is the radius of 6.35mm to the predetermined depth 5 the rate for 100mm/using the load cell 4 and pulling up at this rate immediately, it measured whether incrustation would disappear completely within 30 seconds. Incrustation considered the maximum pushing depth 5 which disappears completely as whenever [ deformation recovery ]. Drawing 1 is the top view of the equipment which measures whenever [ deformation recovery ].

(10) One film was contacted to the hot platen for heat seals of the hand type tray packaging



machine (poly wrapper made from ARC) of heat-resistant marketing for 2 seconds, the highest hot-platen temperature which a hole does not open to a film was measured, and it considered as heat-resistant temperature.

[0035] Example 1 [preparation of an external layer resin constituent]

As a resin constituent which constitutes an external layer, 98 % of the weight (the content of Eve Tait H2081 by Sumitomo Chemical Co., Ltd., 10 MFR(190 degrees C) =2g /, and minutes, and a vinyl acetate unit = 15.8 % of the weight) of ethylene-vinylacetate copolymers and the resin constituent which carried out melting kneading and prepared 2 % of the weight (Marubishi Yuka Kogyo STO- 405) of antifoggers with the Banbury mixer were used.

[0036] [Preparation of an interlayer resin constituent] In the resin constituent which constitutes an interlayer As a crystalline propylene system polymer, it is a propylene-ethylene random copolymer (no BUREN WF 732-1 by Sumitomo Chemical Co., Ltd., and ten MFR(230 degrees C) =5.5g /, and parts). 3-% of the weight 50 % of the weight, The content of content =97% of the weight of a propylene unit, and an ethylene unit = as amorphous polyolefine -- a propylene-butene-1 copolymer (UBETAC UT 2780 by Ube Rexene --) The content of a propylene unit = 65 % of the weight, The content of a butene-1 unit = the resin constituent which carried out melting kneading and prepared 80 % of the weight of resin mixture and 20 % of the weight (AI Cong P125 made from Arakawa Chemical industry) of petroleum resin which carried out melting kneading of the 50 % of the weight with the Banbury mixer 35% of the weight with the 1 shaft extruder was used.

[0037] [Manufacture of a film] In an external layer, it has the obtained ethylene-vinylacetate copolymer constituent, and has the resin constituent of amorphous polyolefine, a crystalline propylene system polymer, and petroleum resin in an interlayer, and the percentage of an external layer / interlayer / external layer fabricated the two-sort three-layer laminated film which is the thickness of 13 micrometers which is 38/24/38 by the blow up ratio 4.5 with the working temperature of 190 degrees C using the Placo three-layer tubular blown film processing machine. The evaluation result of the obtained film is shown in Table 1.

[0038] The laminated film was fabricated like the example 1 except using the 100 % of the weight of the same crystalline propylene system polymers as what was used for example of comparison 1 interlayer in the example 1. The evaluation result of the obtained film is shown in Table 1.

[0039] The laminated film was fabricated like the example 1 except using 100 % of the weight of resin mixture containing the 50 % of the weight of the same amorphous polyolefines as what was used in 50 same % of the weight of crystalline propylene system polymers and the same example 1 as what was used for example of comparison 2 interlayer in the example 1. The evaluation result of the obtained film is shown in Table 1.

[0040]

[Table 1]

			実施例 1	比較例 1	比較例 2
フ ィ ル ム 構 成	外 面 層	E V A	98%	98%	98%
		STO-405	2%	2%	2%
	中 間 層	APO(APO+PP)×100	50%	0%	50%
		PP(APO+PP)×100	50%	100%	50%
		(APO+PP)/中間層組成物× 100	80%	100%	100%
		P125/中間層組成物×100	20%	0%	0%
	層構成比 (外面層/中間層/外面層)		38/24/38	38/24/38	38/24/38
	フィルム厚み (μm)		13	13	13
物 性	1%SM(kg/cm <sup>2</sup> ) MD/TD		520/540	2400/2500	500/520
	ヘイズ (%)		1.3	1.8	1.4
	カット性		○	△	×
	表面仕上がり		○	×	△
	変形回復性 (mm)		14	7	11
	耐熱性 (°C)		113	120	115

front Naka and EVA:ethylene-vinylacetate copolymer PP : crystalline propylene system polymer  
 APO:amorphous polyolefine STO-405: -- antifogger (Marubishi Yuka Kogyo STO- 405)  
 P125: Petroleum resin (Al Cong P125 made from Arakawa Chemical industry)

[Translation done.]

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- 2.\*\*\*\* shows the word which can not be translated.
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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the top view of the equipment which measures whenever [ film deformation recovery-].

[Description of Notations]

1 ... A circular sample film, 2 ... A film fixture, 3 ... Pin

4 ... A load cell, 5 ... It pushes in and is the depth.

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[Translation done.]

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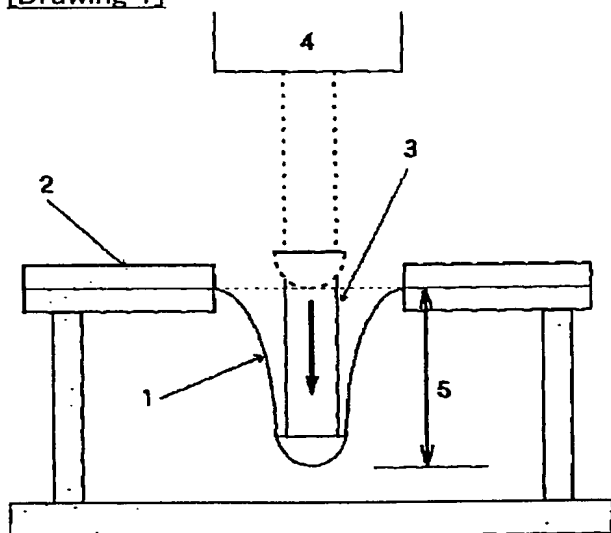
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DRAWINGS

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[Drawing 1]



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[Translation done.]